Fatal Community-Acquired Primary *Candida* Pneumonia in an Alcoholic Patient

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Abstract

A 54-year-old alcoholic woman developed fulminant community-acquired pneumonia. Despite receiving intensive support measures, she died four days after admission. An autopsy revealed bronchopneumonia with clusters of pseudohyphae and yeast-like fungi, and *Candida albicans* was isolated from both tracheal aspiration specimens obtained on admission and the postmortem lungs. The absence of vessel invasion or any other organ involvement led to a diagnosis of primary *Candida* pneumonia secondary to aspiration, rather than pulmonary seeding from systemic infection. *Candida* species isolated from respiratory tract samples are usually regarded as originating from colonization; however, the possibility for true *Candida* pneumonia should be taken into account, even in the setting of community-acquired pneumonia.

Key words: *Candida albicans*, community-acquired pneumonia, alcohol abuse


Introduction

*Candida* pneumonia is a rare disorder that is challenging to diagnose, with a definitive diagnosis being based exclusively on histological evidence (1, 2). When the disease occurs, the pathogenic mechanism is largely attributed to secondary lung involvement in a systemic infection. Therefore, invasive *Candida* infection limited to the lungs (primary *Candida* pneumonia) is quite a rare form of the disease (3). To date, autopsy studies of primary *Candida* pneumonia occurring in cancer patients have attributed the disease to hospital-acquired pneumonia (2, 4, 5). However, there is still a paucity of literature regarding whether the disease can occur in the community-acquired setting. We herein describe a case of histopathologically-proven primary *Candida* pneumonia that developed in an alcoholic patient as fulminant community-acquired pneumonia.

Case Report

A 54-year-old alcoholic woman consulted a primary care physician due to general malaise lasting for four days. She presented with impaired consciousness and hypoxemia, and chest X-ray showed bilateral infiltrations. She was transferred to our hospital due to the development of progressive respiratory failure after a single administration of ampicillin sulbactam.

On admission, she presented with disturbed consciousness and severe respiratory distress requiring assisted ventilation. Her heart rate was 80 beats/min, her respiratory rate was 30 breaths/min, her body temperature was 32.6°C and her blood pressure was 104/60 mmHg after the administration of noradrenaline. Coarse crackles were present in both lower lung lobes. Stomatitis was not found on inspection of the oral cavity. Chest X-ray performed on arrival showed bilateral infiltrations in the mid to lower lung fields (Fig. 1). A chest computed tomography (CT) scan showed bilateral consolidations with air bronchograms in the lower lobes (Fig. 2). The laboratory findings obtained on admission were as follows: the white blood cell count was 11,100/mm³, the platelet count was 22,000/μL, the albumin level was 1.4 g/dL, the total bilirubin level was 2.8 mg/dL, the aspartate aminotransferase level was 150 IU/L, the alanine aminotransferase level was 25 IU/L, the lactate dehydrogenase level was 311 IU/L, the serum creatinine level was 1.4...
The chest X-ray on admission showed bilateral pulmonary infiltration in the mid to lower field of the lung.

Figure 2. Computed tomography showed bilateral consolidation with air bronchogram.

Microscopic examination revealed many yeast-like fungi and clusters of pseudohyphae accompanying cellular exudate and surface erosion of alveolar bronchiolo (PAS stain, ×200).

Discussion

Candida pneumonia remains poorly defined as a clinical entity, primarily due to the difficulty of establishing the diagnosis. Since the isolation of Candida species from respiratory specimens alone cannot distinguish invasive infection from colonization (6), a convincing diagnosis of Candida pneumonia requires confirmation on histopathologic examinations (1, 2). These may not be readily available in normal clinical practice. Therefore, our understanding of this disease primarily rests on the results of previous autopsy studies (2, 4, 5), and available data suggest that Candida pneumonia is a rare disorder. In fact, Meersseman et al. demonstrated that no single case of Candida pneumonia was found...
among 232 autopsy cases in the intensive care unit, despite frequent isolation of Candida species from respiratory tract samples (7).

Candida pneumonia occurs in two settings. It occurs primarily as part of hematogenously disseminated candidiasis in immune-compromised patients or, rarely, may follow aspiration of colonized oropharyngeal or gastric contents. The latter form, primary Candida pneumonia, is extremely rare; however, autopsy studies from a large cancer center documented that the disease occurred in 31 (0.4%) of 7,725 cases and can be life-threatening (4). Kontoyiannis et al. also reported that 23 (3.4%) of 676 autopsy cases were identified as primary Candida pneumonia (2). These available data on primary Candida pneumonia are, however, considered to reflect hospital-acquired cases, and only a few reports have documented the disease in the community-acquired setting (5, 8, 9). To our knowledge, the present case is only the fourth report describing primary Candida pneumonia acquired in the community.

In the present case, antecedent or concomitant bacterial pneumonia, especially with anaerobes, could not be ruled out; however, such a diagnosis seems unlikely because no pathogenic organisms other than C. albicans were detected on Gram staining or culture of the tracheal aspirates. Although the administration of antibiotics before admission might have inhibited bacterial growth, the duration was too short for bacterial organisms to disappear on Gram staining due to the antimicrobial effect. Importantly, a definite diagnosis of Candida pneumonia was established by the post-mortem findings showing histologic evidence of pulmonary Candida invasion in the absence of multi-organ involvement, thus suggesting the presence of hematogenous dissemination. We can, therefore, reasonably conclude that this is a case of primary Candida pneumonia, not bacterial pneumonia followed by Candida infection nor pulmonary seeding from systemic Candida infection.

In the present case, the aspiration of colonized C. albicans in the oral cavity and/or gastrointestinal tract was suggested to be the cause of primary Candida pneumonia. Alcohol abuse could have been the predisposing factor for aspiration. The presence of bilateral consolidations, predominantly in the dorsal lungs, on chest CT scans raised the possibility that the mechanism of entry of the infectious particles was aspiration of oropharyngeal contents. Although the autopsy findings did not reveal colonization of C. albicans in any area of the digestive tract other than the duodenum, the use of anti-fungal agents most likely made it difficult to detect C. albicans colonization. It was not clear whether the patient had experienced episodes of aspiration, vomited and aspirated before the onset of Candida pneumonia or suffered from microaspiration. Interestingly, it has been reported that C. albicans isolated from the stool of critically ill patients in poor nutritional condition with phosphate deficiencies is transformed to a highly virulent and lethal phenotype (10). In the present case, malnutrition and alcohol abuse may have led to phosphate depletion, which can potentially increase the severity of Candida pneumonia. A previous report also showed that primary Candida pneumonia occurring in cancer patients is frequently fatal and directly contributes to death in 84% of patients (4).

The present case should alert clinicians to the existence of potentially life-threatening primary Candida pneumonia in the community-acquired setting. Candida species isolated from respiratory tract samples are usually regarded as originating from colonization; however, one should take account the possibility of true Candida pneumonia, even in the setting of community-acquired pneumonia.

The authors state that they have no Conflict of Interest (COI).

References